

Nuclear reactions induced by heavy ions

S/903/62/000/000/025/044
B102/B234

α , β , γ , δ , ϵ , and ζ (enumerated according to decreasing probability) and for Br , Kr , Xe they were 2α , α , β , γ , δ , ϵ , ζ ; for C , N , O + Be they were 3α , α , β , γ and 5α (the latter two with equal probability) and for Br , Kr + Be 2α , α , β , γ . Also energy spectra and angular distributions were measured. The results of the latter indicate the considerable contribution of the α particles. It would be interesting to see the α -particle stars in the α -particle stars. The α -particle stars are the α -particle stars. There are 7 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical Institute AS UkrSSR)

Card 2/2

SAMOYLOV, V.P.; KULYGINA, M.N.

Use of an epoxy compound for vacuum-tight cementation of Teflon
and a metal. Prib. i tekhn. eksp. 8 no.5:225 S-0 '63.
(MIRA 16:12)

1. Fiziko-tekhnicheskiy institut AN UkrSSR.

SAMOYLOV, V.P.; KULYGINA, M.N.

Existence of adsorption effect in systems used in the technology
of hot casting of ceramics. Zhur. prikl. khim. 37 no. 5:965-
971 My '64. (MIRA 17:7)

1. Fiziko-tekhnicheskii institut AN UkrSSR.

RZHAVITIN, Vladimir Nikolayevich, prof., doktor biolog.nauk;
NAZAROV, S.P., dotsent; KULYGINA, T., red.; POPOVA, M., tekhn.red.

[Vegetative hybridization of plants] Vegetativnaia gibridizatsiia
rastenii. Saransk, Mordovskoe knizhnoe izd-vo, 1960. 316 p.
(Saransk. Mordovskii gosudarstvennyi universitet. Uchenye zapiski,
no.10) (MIRA 14:6)

(Grafting)

1. NEMLIYENKO, F. Ye. ; KULYK, T. A.
2. USSR (600)
4. Nigrospora Oryzae
7. Peculiarities in the pathogenesis of nigrosporosis on corncob. Dop. AN URSR No. 1, 1953.
9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

84888

S/102/60/000/001/002/006
C111/C222

6.9200

AUTHOR: Kulyk, V.T.

TITLE: Method for Determining the Dynamic Characteristics of Industrial Objects From Their Normal Operating Records in the Presence of Noise ⁷

PERIODICAL: Avtomatika, 1960, No.1, pp.15-25

TEXT: The author considers the determination of the dynamic characteristics of objects from the data of their normal operating records in the presence of disturbances. The usual solution of the problem (Ref.3,4) with the aid of the correlation method leads to the solution of the algebraic system of higher order

$$(1) \quad R_{\mu\varphi}(t_i) = \sum_{j=0}^{\infty} k(\tau_j) R_{\mu\mu}(t_i - \tau_j),$$

where $R_{\mu\varphi}$ is the correlation function of the input and output terms, $R_{\mu\mu}$ is the autocorrelation of the input term and $k(\tau_j)$ are the discrete ordinates of the impulse characteristic $k(\tau)$ which can be determined from (1). Beside of the computational difficulties of the solution of (1), the correlation method has the disadvantage that the delay of the object cannot be determined.

Card 1/3

84888

S/102/60/000/001/002/006
C111/C222

Method for Determining the Dynamic Characteristics of Industrial Objects
From Their Normal Operating Records in the Presence of Noise

The author proposes an "interpolation method" which has not these lacks. The method bases on the interpolation of the sought impulse characteristic (weight function) of the object by a certain analytic expression, whereby the order of the algebraic system to be solved becomes essentially less. The author considers the approximation of the impulse characteristic of the object by a polynomial and by an exponential function with a delay. The method uses the method of least squares. It is shown that the solution of the proposed system

$$(5) \quad \varphi_n = k_0 \mu_n + k_1 \mu_{n-1} + \dots + k_M \mu_{n-M} \quad (n=0, 1, \dots, N),$$

where μ_i are discrete values of the input term, φ is output term, for normally distributed noises is equivalent in the sense of least squares to the solution of (1). It is shown that it is still more suitable to use the criterion of the maximal credibility instead of the least squares. Recurrence

Card 2/3

84883

S/102/60/000/001/002/006
C111/C222

Method for Determining the Dynamic Characteristics of Industrial Objects
From Their Normal Operating Records in the Presence of Noise

formulas for a simplification of the calculation of the coefficients of the
proposed equations and an example are given. The author mentions Yu. V.
Linnik,

There are 2 figures, 1 table and 8 references: 6 Soviet, 1 German and
1 American. X

ASSOCIATION: Kyyivs'kyi ordena Lenina politekhnichnyi instytut (Kiev "Lenin
Order" Polytechnical Institute)

SUBMITTED: June 20, 1959

Card 3/3

26.2195
13.2000

S/102/60/000/003/003/006
C 111/ C 333

AUTHOR: Kulyk, V. T.

TITLE: Some Methods for Simulating Cybernetic Systems ¹⁶ From Their
Normal Operating Records

PERIODICAL: Avtomatika, 1960, No. 3, pp. 17-30

TEXT: The author considers the problem of determining the parameters of cybernetic system models described by linear differential equations from normal operating records. ✓
B

Methods involving the use of a differential analyzer (analog digital or hybrid) are proposed for solving this problem. The methods are based upon ideas similar to the principles of the interpolative method (2) and possess simplicity of calculations (there are no calculations of the correlation function) and compact results (due to a priori fixed structure) in comparison with the well-known methods of the determination of dynamic characteristics of systems from normal operating records [1]. It is shown that at the same time the methods permit smoothing out noise uncorrelated with the inputs of the system.

The algorithms of the determination of the dynamic characteristics of systems, applicable to the proposed methods, have a common
Card 1/2

S/102/60/000/003/003/006
C 111/ C 333

Some Methods for Simulating Cybernetic Systems From Their Normal Operating Records

logical scheme (§ 3) and differ basically from each other by the subalgorithms of search for parameter values (§§ 4-6). The indeterminate algorithm (with random search), the incompletely determinate algorithms (determinate search, but random initial values) and the completely determinate algorithms are considered. Examples for a system with two inputs and one output solved on a "MN - 7" analog computer are analysed.

A tentative estimate of the methods is given.

A. A. Lyapunov is mentioned in the paper.

There are 8 figures, 13 tables, and 5 references: 3 Soviet, 1 German and 1 American.

ASSOCIATION: Kyivskyy ordena Lenina politekhnichnyy instytut
(Kyiv "Order of Lenin" Polytechnical Institute)

SUBMITTED: December 11, 1959

Card 2/2

20477

S/102/60/000/003/003/006
D202/D305

16.9500(1031,1121,1132)

AUTHOR: Kulyk, V.T.

TITLE: Some methods of simulating cybernetic systems using
their normal operating data

PERIODICAL: Avtomatika, no. 3, 1960, 17-30

TEXT: In many cases cybernetic systems (CS) are treated as "black boxes" in which one observes the magnitudes of input (vector M) and output (vector F) and finds a transfer operator P which connects M and F, without analyzing the internal structure of the system. In this paper, the author examines the problem of determining the parameters of models of cybernetic systems, describable by linear differential equations with constant coefficients, using the records of their normal operation, obtained during the final time interval. The system described by the operator P is a simulator of the real CS. The problem of determining P is equivalent to finding

ux

Card 1/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

an algorithm (A), according to which the information M and F is converted to P. If A is found, its realization can be obtained on an information machine (IM). This problem is examined under the following conditions: 1) Output information (the records of M and F) is obtained with the normal operation of the system. This is necessary in analyzing behavior of living organisms and desirable for those systems which participate in continuous industrial processes; 2) The record of M and F is carried out during the final time interval Abstractor's note: Designated C.T.7. CS refers to the systems, whose P can be expressed as a system of differential equations. In his first rough examination of P the author considers the simple linear differential equations with constant coefficients only. For this type of CS the problem of finding P is reduced to determining the matrix of the transfer function $W_{sr}(p)$ or the matrix of the impulse characteristics $W_{sr}(\tau)$ with r inputs and s outputs. Various methods of determining $W_{sr}(p)$ or $W_{sr}(\tau)$ are described by Yu.P. Leonov and L.N. Lipatov (Ref. 1: *Primeneniye statistiches-*

ix

Card 2/16

20477

S/102/60/000/003/003/006

D202/D305

Some methods of simulating ...

kikh metodov dlya opredeleniya kharakteristik ob"yektov (Use of Statistical Methods for Determining the Characteristics of Systems) "Avtomatika i Telemekhanika", No. 9, 1959). These methods are complicated and long. The algorithms considered in this paper are of such type that the simulating devices can be utilized. The methods proposed here do not require any computations and only simple logical operations. Fig. 1 represents a bloc diagram A. The input to the system in the time-interval (O.T.) is applied at the input of the simulator (simulating this system). The output of the simulator F' is compared with the output of the system in the calculating apparatus (OP), whose output S is the criterion of the similarity. The apparatus KP alters the parameters of the simulator according to the value of the criterion S until S assumes an extreme value. Then the measuring apparatus (VP) gives the values of the parameters of the simulator. The essential feature of this scheme is that the functions of time M and F are utilized directly without calculating the correlation functions which are required

Card 3/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

in the use of the correlation methods described in Ref. 1 (Op.cit.). Owing to this fact A can be simplified considerably, the degree of smoothing of the noise remaining the same as in the correlation methods. This can be achieved by taking the root-mean-square deviation F' from F in the interval (t_0, T) as the criterion of the similarity S :

$$S = \sqrt{\int_{t_0}^T (\Phi - \Phi')^2 dt}. \quad (1)$$

assuming that the simulator consists of a circuit with r inputs u_1, u_2, \dots, u_r and one output φ' . Squaring the expression and differentiating for minimum deviation φ' from φ an expression

$$R_{\varphi\varphi'}(\tau) - \int_0^T w_{11}(\tau_1) R_{\mu_1\mu_1}(\tau - \tau_1) d\tau_1 - \dots - \int_0^T w_{r1}(\tau_1) R_{\mu_r\mu_r}(\tau - \tau_1) d\tau_1 = 0. \quad (6)$$

XX

Card 4/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

is finally obtained, where $R_{\varphi\mu}$, $R_{\mu\mu}$ are the correlation functions of the corresponding variables and w_{i1} - impulse function of the i -th input. If $\varphi = \varphi^0 + \eta$, where η is the noise independent of μ_1 , then $R_{\varphi\mu_1}(\tau) = R_{\varphi^0\mu_1}(\tau)$. Thus $w_{i1}(\tau)$ which satisfy Eq. (6) with

$i = 0, 1, \dots, r$, i.e. which satisfy minimum S , correspond to the best approximation φ' to the value of the output φ^0 without noise. These results can be easily applied to several outputs. U.R. Eshbi (Ref. 3: Skhemy usilitelya myslitel'nykh sposobnostey (Schemes for an Amplifier of Thinking Capacity) Avtomaty, sb. pod red. K. Shennona i Dzh. Makkarti, IL., 1956) shows that for an acceptable search time it is necessary to introduce additional limitations. The information about the structure of the system can be such a limitation. If the information is not available, then either the hypothesis of the structure is checked or the actual object is approximated beforehand by a fixed structure. The latter is often applied in practice. R. Ol'denburg and G. Sartorius (Ref. 4: Dinamika avtomaticheskogo regulirovaniya (Dynamics of Automatic Re-

Card 5/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

gulation) Gosenergoizdat, M., 1949) show that the approximation to the system by the circuit of the n-th order, e.g. 3rd order, does not result in the loss of information in all practical cases. In this way it is desirable to utilize a simulator with a fixed structure. Further, the A is illustrated by examples which had been solved by the simulating apparatus type MN-7. In the first example an algorithm A1 with the random search of parameters is realized. The system under consideration has two inputs and one output and its transfer function $w_2(p)$ has a lower order than $w_1(p)$, where p is the logical operator equal to zero if the condition of the completion of the search process is not satisfied, and equal to unity if it is satisfied. It is required to find probable values $w_1(\tau)$ and $w_2(\tau)$ which represent the behavior of the system in this time-interval most faithfully. $w_1(\tau)$ depends on the parameters: k_1, k_2, k_3 and $w_2(\tau)$ on the parameters k_4 and k_5 . The parameters are chosen at random and their values are arbitrary. The process of solution is represented by the oscillograms of φ and φ' and dispersion

Card 6/16

✓X

20477

S/102/60/000/003/003/006

D202/D305

Some methods of simulating ...

s^2 for the initial values of parameters (Fig. 4a - e). Another case is described where a different order of choice of parameters is considered. The system of equations of the type (6) is examined for $k = 0, 1, \dots, n$. If the inputs $\mu_1, \mu_2, \dots, \mu_r$ are not interdependent then in the right hand side of

$$\left. \begin{aligned} R_{\mu_1}(\tau) &= \int_0^{\bar{\tau}} w_{11}(\tau_1) R_{\mu_1, \mu_1}(\tau - \tau_1) d\tau_1 + \int_0^{\bar{\tau}} w_{21}(\tau_1) R_{\mu_2, \mu_1}(\tau - \tau_1) d\tau_1 + \dots \\ &\quad \dots + \int_0^{\bar{\tau}} w_{r1}(\tau_1) R_{\mu_r, \mu_1}(\tau - \tau_1) d\tau_1 \\ R_{\mu_2}(\tau) &= \int_0^{\bar{\tau}} w_{12}(\tau_1) R_{\mu_1, \mu_2}(\tau - \tau_1) d\tau_1 + \int_0^{\bar{\tau}} w_{22}(\tau_1) R_{\mu_2, \mu_2}(\tau - \tau_1) d\tau_1 + \dots \\ &\quad + \dots + \int_0^{\bar{\tau}} w_{r2}(\tau_1) R_{\mu_r, \mu_2}(\tau - \tau_1) d\tau_1 \end{aligned} \right\} \cdot (14) \quad \text{✓}$$

Card 7/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

$$R_{\tau p_r}(\tau) = \int_0^{\infty} w_{11}(\tau_1) R_{p_1 p_r}(\tau - \tau_1) d\tau_1 + \int_0^{\infty} w_{21}(\tau_1) R_{p_2 p_r}(\tau - \tau_1) d\tau_1 + \dots + \int_0^{\infty} w_{r1}(\tau_1) R_{p_r p_r}(\tau - \tau_1) d\tau_1 \quad (14)$$

only one term $\int_0^{\infty} w_{i1}(\tau_1) R_{p_i p_i}(\tau - \tau_1) d\tau_1$ remains which contains the autocor-

relation function of the i-th input, and the transfer of the i-th input. It is possible that in an actual system the input signals are not interdependent. Therefore, there are two possibilities of improving A. These possibilities are examined using the first example. First a determinate A2 without the exclusion of the inter-

Card 8/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

dependent part of the input signals is considered. The initial values of parameters are the same as in the first example. The results are presented in tabulated from (Table 7). Fig. 4 e - i [Abstractor's note: See above] represent the oscillograms corresponding to this example. Next a determinate A3 is examined with the exclusion of an interdependent part of input signals. To obtain w_1 and w_2 with the closer approximation to the actual values it is necessary to make μ_1 and μ_2 independent. Therefore w_3 is found which expresses the connection between μ_1 and μ_2 [Abstractor's note: The process of search of the parameters $w_3 - k_1, k_2$ and k_3 is denoted by Y_1]. Next $\Delta \mu_1 = \mu_1 - \mu_1^0$ (or $\Delta \mu_2 = \mu_2 - \mu_2^0$) is found that is independent of μ_2 (or of μ_1), which is used as the initial value in determining w_1 (or w_2). After finding w_1 (operator Y_2), $\varphi_2 = \varphi - \varphi_1$ is found and then w_2 (operator Y_3) is obtained. The algorithm of search is

$$Y = f_1 Y_1 + f_2 Y_2 + f_3 Y_3 \quad (16)$$

Card 9/16

X

"..."

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

where f_i are the logical operators connected by condition $f_1 + f_2 + f_3 = 1$ and by the order of operation $(f_1 f_2 f_3)(f_1 f_2 f_3) \dots$, and Y_i are determined from

$$Y = q_1 K_1 + q_2 K_2 + \dots + q_m K_m. \quad (III) \quad (11)$$

where $q_i = 1$ at the beginning of operation, (q - logical operator and Y - subalgorithm of search). The scheme is represented in Fig. 5. Results of w_3 , w_1 and w_2 are given in tabulated form and the oscillograms of the output are presented as in the previous case. The author next considers a determinate algorithm with known initial values of parameters. With an unfavorable choice of the initial values of the variable parameters the process of search becomes long. The area of search can be reduced if the values of the parameters are at least known roughly. Further calculations are carried out using one of the methods described above. Another version of A, A5, which can be useful, is examined. In this method first the intermediate values are calculated (i.e. w_3 or w_1 are

Card 10/16

X

20477
S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

found), and then the operations are carried out as before. The operation of this algorithm is explained using the first example and the method of calculation is given. The output values are given in the numerical form. $w_2(\tau)$ is calculated. Finally $w_1(\tau)$ is obtained. The quality of A5 can be characterized by the accuracy of the results (in this case by the degree of approximation of $w_1(\tau)$) and the number of steps required to reach the solution. Finally the author shows that the approximation with w_2 is worse than with w_1 . A further increase of the order is, however, not required since the second order gives a sufficiently good approximation. The application of the latter algorithm is suitable when the simulating apparatus has a small number of calculating elements in comparison with the complexity of the system. In this case the algorithm A5 permits the simplification of the scheme. A4 can give better results than A3 but requires more calculations than A3, A2 and A3 are approximately equivalent. But the results of A2 are better when the input signals are more independent. Results of A3

Card 11/16

20477

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

are useful in every case. Thus of all the 5 algorithms described in this paper A2 and A3 are most suitable for practical application. They result in a simple realization of the automatic solution of a specialized information machine (IM) which will be described in a separate paper. There are 8 figures, 13 tables and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: U.R. Eshbi, Skhemy usilitel'ya myslitel'nykh sposobnostey (Schemes for an Amplifier of Thinking Capacity), Avtomaty, sb. pod. red. K. Shennona i Dzh. Makkarti, IL, 1956, Abstractor's note: Ref. 3 is given in Russian7.

ASSOCIATION: Kyivivs'kyi ordena Lenina politekhnichnyy institut
(Kiev Order of Lenin Politechnic Institute)

SUBMITTED: December 11, 1959

Card 12/16

lx

Some methods of simulating ...

Fig. 1. Principal scheme of information machine.

Legend: 1 - System; 2 - (F);
3 - model; 4 - (F'); 5 - (OP);
6 - (VP); 7 - (KP); 8 - (P).

20477
S/102/60/000/003/003/006
D202/D305

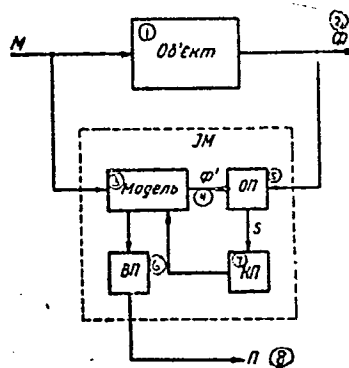


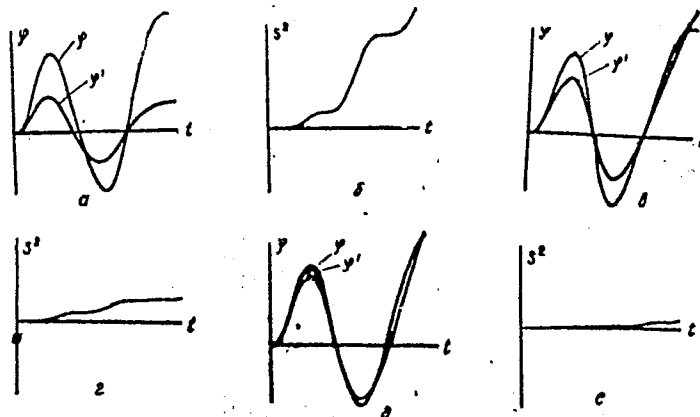
Рис. 1. Принципіальна схема інформаційної машини.

Card 13/16

Some methods of simulating ...

20477
S/102/60/000/003/003/006
D202/D305

Fig. 4 (a - e)



Card 14/16

S/102/60/000/003/003/006
D202/D305

Some methods of simulating ...

Fig. 4 ($\varepsilon - i$)

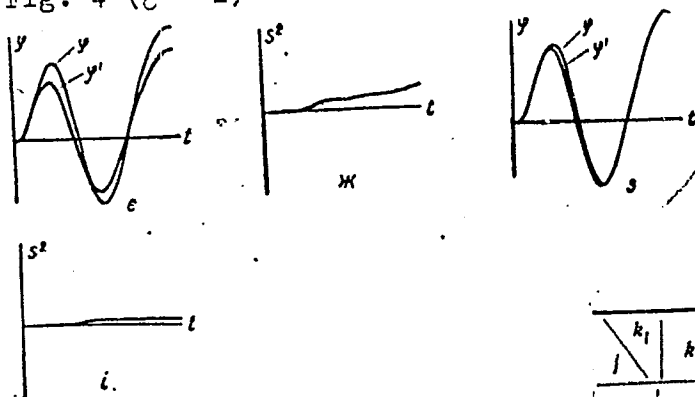


Table 7.

Таблица 7						
k_1	k_2	k_3	k_4	k_5	k_6	S^2
0	0,9	1	1,15	1,03	1	170
5	2,2	0,8	2,05	1,6	0,95	18
10	2,7	0,76	2,36	1,9	0,9	7

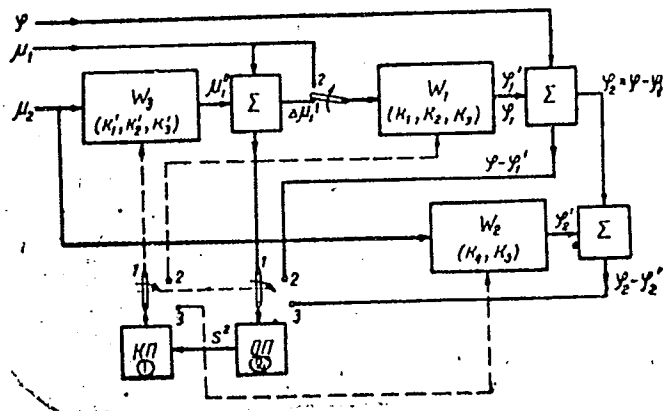
Card 15/16

Some methods of simulating ...

20477
S/102/60/000/003/003/006
D202/D305

Fig. 5.

Legend: 1 - (KP);
2 - (OP).



Card 16/16

43980

27 1230

S/238/62/008/006/003/005
D268/D308

AUTHORS: Kulykov, M.O. and Sledzevs'ka, I.K.
TITLE: Electrocardiogram analysis by electronic computer
PERIODICAL: Fiziologichnyy zhurnal, v. 8, no. 6, 1962, 803-808

TEXT: With the present-day developments in cybernetics and mathematics it is now possible to eliminate subjective errors in diagnosis by the use of mechanical devices either singly or in groups. Results are presented of the automatic analysis of electrocardiograms by electronic computer, using the 'Kiev' computer for the analysis of a single curve during 0.5 - 1 minute. The algorithm of electrocardiogram analysis provided for the introduction into the machine of an electrocardiogram section taken in the second classical lead and the automatic analysis of it giving intervals RR, PP and PQ (or PR) in seconds, the parameters of the waves PQ and the QRS complex in seconds, of waves PQ and R in mv, and the characteristics of the form of wave P. Some of the most frequent

Card 1/2

Electrocardiogram analysis ...

S/238/62/008/006/003/005
D268/D308

characteristic disturbances in the rhythm are also presented from the analysis. The general principles are given for the construction of the algorithm, with the results from a detailed analysis of several electrocardiograms accompanied with data from normal analysis of the same curve. Comparison of the data obtained showed good agreement between characteristics determined automatically and the results obtained by the usual methods.

ASSOCIATION: Hrupa kibernetiky Instytutu fiziologiyi im. O.O. Bohomol'tsya Akademiyi nauk URSR (Cybernetics Group, Institute of Physiology im. O.O. Bohomolets AS UkrSSR) (Kulykov, M.O.); Ukrayins'kyi naukovo-doslidnyy Instytut klinichnoyi medytsyny im. akad. M.D. Strazheska, Kyiv (Ukrainian Scientific Research Institute of Clinical Medicine, im. M.D. Strazhesko, Kiev) (Sledzevs'ka, I.K.)

SUBMITTED: March 14, 1962

Card 2/2

L 15952-66 EWT(m)/T/EWP(t) IJP(c) JD/JG

ACC NR: AP6002648

SOURCE CODE: UR/0021/65/000/011/1472/1474

AUTHOR: Hladyshchevskiy, Ye. I.; Gladyshevskiy, Ye. I.; Kulykova, A. O.;
Kulikova, A. A.

ORG: L'vov State University (L'vivskiy derzhavnyy universytet)

TITLE: Continuous transition between structural types α -ThSi₂ and α -GdSi₂
in the homogeneity region of lanthanum disilicide

SOURCE: AN UkrRSR. Dopovid, no. 11, 1965, 1472-1474

TOPIC TAGS: lanthanum compound, silicide, solid solution

ABSTRACT: The interaction between α -ThSi₂ and α -GdSi₂ structural types in lanthanum silicide were studied in ten alloys containing 31-40 at. % La. The alloys were homogenized in a vacuum for 100 hr at 800C and quenched in cold water. X-ray analysis established the presence of an α -ThSi₂ type structure in alloys with no more than 34 at. % La, and an α -GdSi₂ structure in alloys containing more than this amount of La. As the La content increases, the structure becomes deformed; lattice constants a and b decrease, and c increases. In alloys containing less than 33.3 at.% La, $a = 4.322 \pm 0.005 \text{ \AA}$, $c = 13.86 \pm 0.02 \text{ \AA}$; in those with more than 37.8 at.% La, $a = 4.270 \pm 0.005 \text{ \AA}$, $b = 4.170 \pm 0.005 \text{ \AA}$,
Card 1/2

L 15952-66

ACC NR: AP6002648

$c = 14.05 \pm 0.02 \text{ \AA}$. At the same time, the volume of the unit cell decreases despite the increasing quantity of La, the atoms of which are larger than Si atoms. This indicates the formation of a solid solution in the compound LaSi_2 . On the basis of density data, the unit formula was determined to be LaSi_{2-x} , the deficiency of Si atoms being x . The latter increases from 0 at 33.3 at.% La to 17.5% at 37.8 at.% La. Thus, the findings indicate a continuous transition between structures of α - ThSi_2 type (tetragonal) and α - GdSi_2 type (rhombohedral) in the homogeneity region of lanthanum disilicide. The paper was presented by V. M. Svechnikov — V. N. Svechnikov, Member of AN UkrSSR. Orig. art. has: 1 figure.

SUB CODE: 11 / SUBM DATE: 31Aug64 / ORIG REF: 001 / OTH REF: 004

bvk
Card 2/2

~~KULYSHEV, Yuriy Aleksandrovich~~; VERKHOVTSEV, I., red.; DANILINA, A.,
tekh.n.red.

[At the dawn of Communist labor] Na zare kommunisticheskogo
truda. Moskva, Gos.izd-vo polit.lit-ry, 1958. 46 p. (Iz
istorii sovetskoi rodiny) (MIRA 11:12)
(Labor and laboring classes)

Kolyukin, M.M.

INSTRUMENTATIONS: CHANNEL ANALYZERS

"Effective Anti-coincidence Circuit", by M.M. Kulyukin, Institute of Nuclear Problems, Academy of Sciences USSR, Pribory i Tekhnika Eksperimenta, No 2, September-October 1956, pp 61-62.

The background in an anti-coincidence channel can be reduced by using the circuits described in this report, employing a supplementary coincidence circuit.

Card 1/1

SOV/120-58-6-8/32

AUTHORS: Kozodayev, M.S., ~~Kulyukin, M. M.~~, Sulyayev, R. M., Filippov, A. I. and Shcherbakov, Yu. A.

TITLE: A High Pressure Diffusion Chamber in a Pulsed Magnetic Field
(Diffuzionnaya kamera vysokogo davleniya v impul'snom magnit-nom pole)

PERIODICAL: Priory i tekhnika eksperimenta, 1958, Nr 6, pp 47-55
(USSR)

ABSTRACT: At the present time diffusion chambers are widely used in studies with accelerators. They have turned out to be sufficiently efficient for studying the interaction of nucleons and mesons with separate nucleons and light nuclei (Refs.1 and 2). An installation is described in the present paper which includes a diffusion chamber in a magnetic field which has been used in studying the interaction of protons and mesons with light nuclei. In distinction to other chambers, e.g. those described in Refs.4-6, the necessary temperature distribution in the sensitive layer is set up by means of an internal plexiglass cylinder, as described by Kozodayev et al (Refs.7 and 8). By this means it is possible to reduce the magnitude of horizontal gradients which are the main source of undesirable convections in the chamber. Such a reduction in convective distortion of tracks leads to an increase in the

Card 1/4

SOV/120-58-6-8/32

A High Pressure Diffusion Chamber in a Pulsed Magnetic Field

accuracy in the measurement of momenta. Because of the strong equalising action of the plexiglass cylinder it was found possible to reduce the distance between the side boundaries of the sensitive layer and the outer walls of the chamber and thus improve the utilisation of the working volume of the magnet. Such a construction of the windows means that it is possible to remove the chamber from the magnet without dismantling the latter. It also means that it is possible to use selenoid magnets with small gaps between the coils which in turn makes it easier to obtain large magnetic fields with good homogeneity and economy of supplies. The installation described in this paper consists of a selenoid magnet MS-4, a system for evacuating and filling the chamber and a control panel which controls the accelerator, the chamber and the magnet. The external view of the installation is shown in Fig.1. The chamber was built in 1955 (Ref.3). The diameter of the working region of the chamber is 30 cm, the external diameter being 45.6 cm. The chamber was designed

Card 2/4

SOV/120-58-6-8/32

A High Pressure Diffusion Chamber in a Pulsed Magnetic Field

for work with light gases such as hydrogen, deuterium and helium at pressures up to 25 atm. The magnetic field in the sensitive region, which is produced by the selenoid magnet, MS-4, reaches up to 11 200 oersted, in continuous operation and 16 000 oersted in pulsed operation. The MS-4 magnet is illustrated in Fig.2, in which 1 is the photographic camera, 2 is the chamber, 3 are illuminators and 4 is the coil of the selenoid. There are 2 coils which consist of sectionalised windings of copper tubes. The gap between the coils in the magnet may be varied between 50 and 100 mm. The windings are cooled by distilled water under pressure of 5 atm. A sectional drawing of the diffusion chamber itself is given in Fig.4. The body of the chamber, 1, is of stainless steel, and is made from a single piece. Tubes are attached to the lower part of the body at 2, in which acetone is circulating and thus cools the body. A reservoir, 4, is included and collects condensed methyl alcohol, which is the working liquid. At the bottom of the chamber there is a copper disc, 5, which is used to equalise the temperature. The surface of the disc is electrolytically blackened. A plexiglass cylinder 7 is set up on this disc and, as was mentioned above, this cylinder produces the necessary

Card 3/4

SOV/120-58-6-8/32

A High Pressure Diffusion Chamber in a Pulsed Magnetic Field
temperature gradient. Experiments have shown that glass containing potassium salts gives a strong electron background. Estimates carried out for various kinds of glasses have shown that the main source of the background tracks is K^{40} . The magnetic field strongly localises the tracks of background electrons in the central part of the chamber. However, near the walls there is a non-sensitive zone 2-3 cm wide. The authors thank the following persons for help in the design and the construction of the installation: V.M.Soroko, K.A.Baycher, I.A.Shtyrin and P.T.Pavlov. Acknowledgments are also made to A.G.Potekhin and G.P.Zorin. There are 9 figures and 12 references, of which 7 are English and the rest are Soviet.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy.
(Joint Institute for Nuclear Studies)

SUBMITTED: December 9, 1957.

Card 4/4

VASILENKO, A.T.; ~~KULYUKIN~~, M.M.; SULYAYEV, R.M.; FILIPPOV, A.I.;
SHCHERBAKOV, Yu.A.

Semiautomatic comparator for processing stereoscopic photographs.
Prib.i tekhn.eksp. no.4:56-63 J1-Ag '60. (MIRA 13:9)

1. Ob'yedinennyy institut yadernykh issledovaniy.
(Electronic measurements)
(Photography, Particle track)

82409

S/056/60/038/03/07/033
B006/B014

24.6600

AUTHORS:

Kozodayev, M. S., Kulyukin, M. M., Sulyayev, R. M.,
Filippov, A. I., Shcherbakov, Yu. A.

TITLE:

Interaction of Protons With He^4 Nuclei at an Energy of 630 Mev

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 3, pp. 708-715

TEXT: In the present paper the authors report on their investigations of the scattering of 630-Mev protons on helium nuclei. These investigations were conducted with a high-pressure diffusion cloud chamber. This method made it possible to investigate elastic and inelastic scattering in one and the same experiment. Fig. 1 provides a scheme of the experimental setup. The experimental area was 30 cm in diameter, and the height of the sensitive layer was 5 - 7 cm. The chamber was filled with helium up to 15 - 20 atm. The proton energy was a little lower than the maximum energy supplied by the synchrocyclotron, and amounted to (630 ± 15) Mev. A picture was taken every 15 - 20 sec, and a total of 20,000 stereophotographs was thus obtained. Interaction events were isolated by interpreting the pictures three times with a stereomagnifier;

Card 1/4

E2409

Interaction of Protons With He^4 Nuclei at an
Energy of 630 Mev

3/056/60/038/03/07/033
B006/B014

a total of 444 scatterings of protons on helium nuclei was found. For the most part, interactions were found in two- and three-pronged stars, while only 8 and 4 interactions were found in four- and five-pronged stars, respectively.

The total cross section was found to be $(150 \pm 13) \cdot 10^{-27} \text{ cm}^2$. Table 1 contains the reactions that may take place in the scattering of 630-Mev protons on helium nuclei. They are compiled in four groups and are discussed individually. Fig. 2 shows a picture of a pion pair production. Fig. 3 depicts the angular distribution of elastically scattered protons; $d\sigma/d\Omega$ decreases rapidly with increasing angle. The smallest angle used was 5° in the center-of-gravity system. The elastic cross section was found to be $(22.0 \pm 4.5) \cdot 10^{-27} \text{ cm}^2$

without correcting for small angles, and $(24.0 \pm 5.0) \cdot 10^{-27} \text{ cm}^2$ with a correction. The cross section in the range of from 315 to 630 Mev hardly depended on energy. The angular distribution of elastically scattered protons was also computed within the optical model in Born approximation without considering the spin-orbit- and Coulomb interactions, both for 630 and 315 Mev; the distribution curves obtained are likewise drawn in the diagram (Fig. 3). Inelastic collisions are divided into two groups and separately

Card 2/4

82409

Interaction of Protons With He^4 Nuclei at an
Energy of 630 Mev

S/056/60/038/03/07/033
B006/B014

discussed on this basis: multiple collisions in the helium nucleus and quasi-free scattering.

$N_{pn}^{nucl} = N_{pn} + N_{pn}^k = N_2^k + N_4 + N_5 + N_{pn}^k$ is written down (N_{pn}^{nucl} being the total number of collisions of the impinging proton with the neutrons of the nucleus, N_{pn} the number of quasi-free interactions, N_2^k the number of the two-pronged stars (without elastic scattering), N_4 and N_5 the number of four and five-pronged stars, N_{pn}^k the number of cases of a multiple interaction. The reactions of the various stars are discussed. The contribution of multiple interaction processes is written down as being $\varepsilon = 0.22 \pm 0.07$. Cross sections are compiled in Table 2 and details are discussed for the possible reactions in the case of quasi-free scattering. A section of $(15 \pm 2) \cdot 10^{-27} \text{ cm}^2$ was found for the quasi-elastic p-p scattering, and $(24 \pm 2) \cdot 10^{-27} \text{ cm}^2$ per nucleon for the quasi-free p-n interaction. The total inelastic scattering cross section is found to be $(126 \pm 14) \cdot 10^{-27} \text{ cm}^2$, the cross section for events involving π -meson production in p-n collisions was found to be $(1.3 \pm 0.5) \cdot 10^{-27} \text{ cm}^2$ per neutron. Fig. 4 shows the angular distribution of the quasi-elastic p-p

Card 3/4

Interaction of Protons With He⁴ Nuclei at an
Energy of 630 Mev

S/056/60/038/03/07/033
B006/B014

scattering. The authors finally thank A. G. Potekhina, V. F. Poyenko, and Ye. A. Shvanev for their assistance. There are 4 figures, 2 tables, and 17 references, 7 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: September 10, 1959 ✓

Card 4/4

84387

S/056/60/032/004/005/048
B004/B070

24.6900

AUTHORS:

Kozodayev, M. S., Kulyukin, M. M., Sulyayev, R. M.,
Filippov, A. I., Shcherbakov, Yu. A.

TITLE:

Angular and Momentum Distributions of Residual Nuclei in
Inelastic Scattering of Fast π -Mesons and Protons From
Helium ⁷⁹

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 4(10), pp. 929-936

TEXT: The authors studied the angular and momentum distributions of the residual nuclei in quasifree interaction of fast pions and protons with helium nuclei. A high pressure diffusion chamber was employed and was irradiated by particle beams of the synchrocyclotron of their institute. The energy of the protons was (630 ± 15) Mev, that of the π^+ -meson (237 ± 7) Mev, and that of the π^- -meson (330 ± 6) Mev. 20,000 photographs were taken of proton and π^- -meson beams, and 10,000 of the beams of π^+ -mesons. The details of the experiment, evaluation of the plates, and the

Card 1/3

84387

Angular and Momentum Distributions of
Residual Nuclei in Inelastic Scattering of
Fast π -Mesons and Protons From Helium

S/056/60/039/004/005/048
B004/B070

identification of events are described already in Refs. 8 and 9. Fig. 1 shows a typical quasielastic proton - proton scattering event. The observed reactions and their cross sections are given in Table 1. Fig. 2 shows the angular distribution of the residual nuclei in quasifree p - p scattering; Fig. 3 shows the angular distribution for the interaction of π^+ - and π^- -mesons. The residual nuclei were predominantly emitted forward. The anisotropy of the angular distribution is characterized by $\alpha = N_1/N_2$ (N_1 = number of nuclei emitted in the forward direction, N_2 = number of nuclei emitted backward). The values obtained are: $\alpha_p = 2.17 \pm 0.15$, $\alpha_\pi = 1.26 \pm 0.13$. The momentum distributions of the residual nuclei are shown in Fig. 4 (protons) and Fig. 5 (pions). The observed results are interpreted by the authors on the basis of the Serber - Goldberger model. When the additional momentum $\Delta \vec{p}$ imparted to the residual nucleus by the knocked-out nucleon is taken into account, a good agreement between the experimental and the calculated data is obtained (Fig. 6). The angular distribution for the reaction (1):

Card 2/3

84367

Angular and Momentum Distribution of
Residual Nuclei in Inelastic Scattering of
Fast π -Mesons and Protons From Helium

S/056/60/030/004/005/048
B004/B070

$p + \text{He}^4 \rightarrow p + p + \text{H}^3$ was calculated by means of a "Ural" computer. Figs. 7 and 8 show the momentum spectra of H^3 nuclei where account has been taken of the interaction between the nucleon and the residual nucleus. The momentum p_0 for pions as well as protons was found to be 150 Mev/c which corresponds to the energy value 12 ± 2 Mev. The momentum distribution may be described by a Gaussian function; the value of the momentum becomes $1/e$ of the maximum at 12 ± 2 Mev. The authors mention a paper of M. G. Meshcheryakov et al. (Ref. 4). They thank I. K. Vzorov and Yu. D. Prokoshkin for discussions, I. A. Popova for calculations with the computer, and Ye. A. Shvaneva for help in the evaluation of experimental data. There are 8 figures, 1 table, and 17 references: 3 Soviet, 12 US, 1 British, and 1 German. ✓

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
Institute of Nuclear Research)

SUBMITTED: May 11, 1960

Card 3/3

FILIPPOV, A.I.; KULYUKIN, M.M.; PONTECORVO, B.; SHCHERBAKOV, Yu.A.;
SULYAYEV, R.M.; TSUPKO-SITNIKOV, V.M.; ZAYMIDOROGA, O.A.

Observation of the reaction $\mu^- + \text{He}^3 \rightarrow \text{H}^2 + \nu$. Dubna, Izdatel'skii
otdel Ob"edinennogo in-ta iadernykh issledovani, 1961. 9 p.
(No subject heading)

31775

S/056/61/041/006/021/054
B102/B138

24.6600

AUTHORS: Zaymidoroga, O. A., Kulyukin, M. M., Pontekorvo, B.,
Sulyayev, R. M., Filippov, A. I., Tsupko-Sitnikov, V. M.,
Shcherbakov, Yu. A.

TITLE: Observation of the reaction $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 6(12), 1961, 1804-1808

TEXT: The probability of slow μ^- -meson capture by He^3 is known from highly accurate theoretical calculations. From probability measurements of the reaction $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$ the muon-nucleon interaction constant can be determined and the results compared with those of the weak interaction theory. From the tritium energy in this process the upper limit of the neutral particle mass emitted in muon capture can be estimated and the probability of the process $\mu^- + p \rightarrow n + \nu$, not yet observed with certainty, can be determined. The first results of investigation of muon capture by He^3 are dealt with. A diffusion chamber filled with pure (99.999%) He^3 at Card 1/4

Observation of the reaction ...

31775
S/056/61/041/ 06/021/054
B102/B138

20 atm, was placed in a field of 6000 oe and exposed to a muon beam (momentum 217 Mev/c) from the synchrocyclotron of the OIYaI. The methyl alcohol pressure in the sensitive layer of the chamber was less than 50 mm Hg, the tritium content of the gas used was 10^{-15} . A copper filter was put in the chamber to slow down the mesons and eliminate the pions. The chamber was carefully shielded from thermal neutrons. To date, about 6000 photographs have been taken of events where the muon path stopped at a He^3 nucleus. The reactions sought were identified by the energy of the tritium nucleus. From the pion admixture 1200 stars were observed. The admixture was determined to $\sim 2\%$, causing $\pi^- + \text{He}^3 \rightarrow \text{H}^3 + \gamma$ reactions. 14 events of the $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$ reaction were identified, the mean tritium range was $2.37 \pm 0.02 \text{ mg/cm}^2$. The upper limit of the neutral particle emitted in muon capture was estimated: With 99% probability its mass is less than 6 Mev. The charged particle masses were: $m_{\text{He}^3} = 2808.22 \text{ Mev}$, $m_{\text{H}^3} = 1808.75 \text{ Mev}$, $m_{\mu} = 105.65 \text{ Mev}$. The probability of reaction (1) was $(1.30 \pm 0.40) \cdot 10^3 \text{ sec}^{-1}$. The value calculated by Wolfenstein on the basis of the theory of universal

Card 2/4

31775

Observation of the reaction ...

S/056/61/041/006/021/054
B102/B138

weak interaction was $(1.54 \pm 0.08) \cdot 10^3 \text{ sec}^{-1}$. The constant of vectorial μN interaction was estimated roughly: With a probability of 90%,

$|g_V^\mu| < 2 |g_A^\mu|$. The authors thank P. L. Kapitsa, V. P. Peshkov, V. M. Kuznetsov and A. I. Filimonov for the purification of the He^3 from H^3 carried out in the IFP AN SSSR, S. S. Gershteyn for discussions, V. F. Dzhelepov, L. I. Lapidus for interest and G. M. Aleksandrov, V. V. Kuznetsov, N. V. Lebedev, V. I. Orekhov, V. F. Poyenko, A. G. Potekhin, D. B. Pontekorvo and I. V. Falomkin for experimental help. There are 2 figures and 12 references: 4 Soviet and 8 non-Soviet. The four most recent references to English-language publications read as follows: S. Weinberg. Phys. Rev. Lett. 4, 575, 1960; J. C. Fetkovich et al. Phys. Rev. 118, 319, 1960; E. J. Maier et al. Phys. Rev. Lett. 6, 417, 1961; L. Wolfenstein. Proc. of the 1960 Ann. Int. Conf. on High Energy Phys. of Rochester, Univ. of Rochester, 1960, p. 529; Bull. Amer. Phys. Soc., 6, 33, 1961.

Card 3/4

Observation of the reaction ...

31775
S/056/61/041/006/021/054
B102/B138

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: July 25, 1961

Card 4/4

FALOMKIN, I.V.; FILIPPOV, A.I.; KULYUKIN, M.M.; PONTECORVO, B.;
SHCHERBAKOV, Yu.A.; SUIYAYEV, R.M.; TSUPKO-SITNIKOV, V.M.;
ZAYMIDOROGA, O.A.; SMIRNOVA, L.A. [translator]; SARANTSEVA,
V.R., tekhn. red.

Measurement of the $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \gamma$ reaction rate. Dubna,
Ob"edinennyi in-t iadernykh issledovaniy, 1962. 7 p.
(No subject heading)

FALOMKIN, I.V., FILIPPOV, A.I., KILYUKIN, M.M., PONTECORVO, B.M., SCHERBAKOV, Yu.A.,
SULYAYEV, R.H., TSUPKO-SITNIKOV, V.H., ZAIMENKOVA, O.A.

"Muon-Nucleon Interaction Constants and Muon Capture in HE^3 "

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Institute for Nuclear Research
Laboratory of Nuclear Problems

FILIPPOV, A.I., KULYUKIN, M.M., PONTECORVO, B.M., SHEKHTAROV, Yu.A., RULYAYEV, R.M.,
ZAYMIDOROVA, O.G.

"Observation of the Reaction $\mu + \mu e^+ \rightarrow \mu^+ + \nu$ "

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Institute for Nuclear Research
Laboratory of Nuclear Problems

KULYUKIN, M.M.

FALONKIN, I. V., FILIPPOV, A. I., KULYUKIN, M. M., Yu. A. GCHENBANDY, SULTAYEV, R. M.,
TSUPKO-SITHIKOV, V.M., and ZAYMIDOROGA, O. A.

" η -Meson Capture in HE^3 "

report presented at Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Institute for Nuclear Research
Lab. of Nuclear Problems

24,6700

39680
S/056/62/043/001/055/056
B102/B104

AUTHORS: Zaymidoroga, O. A., Kulyukin, M. M., Pontekorvo, B.,
Sulyayev, R. M., Falomkin, I. V., Filippov, A. I.,
Tsupko-Sitnikov, V. M., Shcherbakov, Yu. A.

TITLE: Measurement of the probability of the $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$ reaction

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
no. 1(7), 1962, 355-358

TEXT: The $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$ -reaction probability was measured in order to study the symmetry of the muon and electron interactions with nucleons. The method used is that described in ZhETF, 41, 1805, 1961. A diffusion chamber filled with He^3 gas (20 atm) in a field of 6 koe was exposed to a muon beam (217 Mev/c) from the synchrocyclotron of the Laboratoriya yadernykh problem OIYaI (Laboratory of Nuclear Problems of the OIYaI), a copper filter being used to moderate the muons. Some 10^5 photographs were taken. The total number of captures and μ -e decay events was determined from the spectrum of the visible secondary tracks of tritium stars and also from the spectrum of the ranges of the stopped secondary

Card 1/3

Measurement of the probability of the ...

S/056/62/043/001/055/056
B102/B104

particles. The two spectra agree, each having two peaks: a higher peak at ranges of 2.0 - 2.6 mg/cm² corresponding to the reaction $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$, and a smaller one at 5.3-5.9 mg/cm² corresponding to $\pi^- + \text{He}^3 \rightarrow \text{He}^3 + \pi^-$. The probability of the muon capture was found to be

$(\Lambda_{\text{He}^3})_{\text{exp}} = (1.36 \pm 0.18) \cdot 10^3 \text{sec}^{-1}$, as against which Wolfenstein (Bull. Am. Phys. Soc. 6, 33, 1961) had calculated $(\Lambda_{\text{He}^3})_{\text{theor.}} = 1.54 \cdot 10^3 \text{sec}^{-1}$ using

the theory of universal vectorial interaction. The result speaks in favor of this theory, and the muon - electron symmetry in nucleon interactions on which the universal theory is based agrees with the experiment (13% accuracy). An estimate of the Fermi and Gamow-Teller

constants (G_F and G_G) of this reaction results in $G_F < 0.1$,

$G_F = -(0.8^{+0.4}_{-0.7}) G_G$ which is in agreement with the theory of universal V-A interaction. There are 2 figures.

Card 2/3

Measurement of the probability of the ... S/056/62/043/001/055/056
B102/B104

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy
(Joint Institute of Nuclear Research)

SUBMITTED: May 30, 1962

Card 3/3

S/056/63/044/001/067/067
B102/B186

AUTHORS: Zaymidoroga, O. A., Kulyukin, M. M., Pontekorvo, B.,
Sulyayev, R. M., Falomkin, I. V., Filippov, A. I.,
Tsupko-Sitnikov, V. M., Shcherbakov, Yu. A.

TITLE: Measurement of the $\mu^- + \text{He}^3 \rightarrow \text{H}^3 + \nu$ reaction probability.
Final results

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44,
no. 1, 1963, 389 - 390

TEXT: The $\mu^- + \text{He}^3$ reaction probability was determined from about 200 events
observed in a He^3 diffusion chamber. Experimental method, and the scanning
and evaluation. procedures used were the same as those described in ZhETF,
43, 355, 1962. The final experimental result is

$\Lambda_{\text{He}^3} = (1.41 \pm 0.14) \cdot 10^3 \text{ sec}^{-1}$. It agrees with the previously published
one which was calculated from the data of 90 events. There is 1 table.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute
of Nuclear Research)

Card 1/2

Measurement of the...

SUBMITTED: November 16, 1962

S/056/63/044/001/067/067
B102/B186



Card 2/2

KULYUKIN, N.M.

S/056/63/044/004/011/044
B102/B186

AUTHORS: Zaymidoroga, O. A., Kulyukin, N. M., Sulyayev, R. M.,
Palcovkin, I. V., Filippov, A. I., Tsupko-Sitnikov, V. M.,
Shcherbakov, Yu. A.

TITLE: The Panofsky ratio for He^3 and the root-mean-square radius
for the $\text{He}^3 \rightarrow \text{H}^3$ transition

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44,
no. 4, 1965, 1180 - 1183

TEXT: The capture of π^- by He^3 was theoretically investigated, and was
effected in the following processes which are allowed from the standpoint
of conservation laws:

- I. $\pi^- + \text{He}^3 \rightarrow p + n + n$ (55,5%)
- II. $\pi^- + \text{He}^3 \rightarrow n + d$ (27,8%)
- III. $\pi^- + \text{He}^3 \rightarrow \text{H}^3 + \pi^0$ (9,4%)
- IV. $\pi^- + \text{He}^3 \rightarrow \text{H}^3 + \gamma$ (4,8%)
- V. $\pi^- + \text{He}^3 \rightarrow d + n + \gamma$ (2,0%)
- VI. $\pi^- + \text{He}^3 \rightarrow p + n + n + \gamma$ (0,5%)

Card 1/3

The Panofsky ratio for...

S/056/63/044/004/011/044
B102/B186

Now the capture of π^- mesons stopped in He^3 could be observed for the first time in the reactions III and IV. B. V. Struminskiy has shown (Preprint CIIYaI, E-1012, Dubna, 1962), that the probability ratio (Panofsky ratio P) of these reactions is related with the r.m.s. radius r of the He^3 - H^3 transition in radiative processes by

$$P = \frac{P_H}{1 - \frac{1}{2}k^2r^2 + \frac{1}{12}k^4r^4} \frac{\omega + M}{\omega_H + m} \frac{\omega_H}{\omega} \left[\frac{E}{E_H} \frac{M}{m} \left(\frac{\mu + m}{\mu + M} \right)^{1/2} \right]^2, \quad (1);$$

k is the wave number of the photon in IV, ω the photon energy in IV, m the neutron mass, μ the π^0 mass, M the tritium mass, E the energy released in III; the quantities with the subscript H refer to $\pi^- + p$ processes. The experiments were made with a He^3 -filled diffusion chamber (20 atm) placed in a magnetic field of 6 koe. Among the 2372 photographs of pion stops in He^3 the processes III and IV were singled out according to the ranges of the particles involved. The relative probabilities of III and IV were $W_3 = (13.5 \pm 0.9)\%$ and $W_4 = (6.2 \pm 0.7)\%$. The Panofsky ratio was obtained as: $P = 2.16 \pm 0.28$, and from this r could be calculated: $r = (1.24^{+0.30}_{-0.46}) \cdot 10^{-13} \text{ cm}$, which is in close agreement with the value calculated by C. Werntz (Nucl. Card 2/3

The Panofsky ratio for...

S/056/63/044/004/011/044
B102/B186

Phys. 16, 59, 1960). The yields of III and IV were found to be somewhat higher than those predicted by Messiah (Phys. Rev. 87, 639, 1952). There are 2 figures.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: November 16, 1962

Card 3/3

ZAYMIDOROGA, O.A.; KULYUKIN, M.M.; PONTEKOROVO, B.; SULTAYEV, R.M.;
FALOMKIN, I.V.; FILIPPOV, A.I.; TSUPKO-SITNIKOV, V.M.; SHCHERBAKOV, Yu.A.

Measuring the probability of the reaction $\mu - {}^4\text{He}^3 \rightarrow \text{H}^3 + \gamma$;
final results. Zhur. eksp. i teor. fiz. 44, no.1:389-390 Ja '63.
(MIRA 16:5)

1. Ob'yedinennyy institut yadernykh issledovaniy.
(Nuclear reactions)

ZAYMIDOROGA, O.A.; KULYUKIN, M.M.; PONTEKOIWO, B.; SULTAYEV, R.M.;
FALOMKIN, I.V.; FILIPPOV, A.I.; TSUPKO-SITHIKOV, V.M.;
SHCHERBAKOV, Yu.A.

Measurement of the total probability of muon capture in He^3 .
Zhur. eksp. i teor. fiz. 45 no.6:1803-1807 D '63. (MIRA 17:2)

1. Ob'yedinennyy institut yadernykh issledovaniy.

L 14307-63

EWB(q)/EWT(m)/BDS AFPTC/ASD JD/JG

ACCESSION NO: A1000110

AUTHOR: Lavticonova, G. A.; Kulyukin, M. M.; Smirnov, R. M.; Filippov, A. I.; Tsupko-Sitnikov, V. M.; Shcherbakov, Yu. A.

TITLE: Formation of helium mesic atoms in a hydrogen-helium gas mixture

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1852-1858

TOPIC TAGS: helium mesic atom formation, helium, hydrogen, direct attachment, muon transfer

ABSTRACT: The formation of helium mesic atoms in a mixture of helium and hydrogen was studied in a diffusion cloud chamber at 19 atmospheres pressure. The experiment was performed to clarify the roles of the two possible mechanisms of muon capture by helium. The results show that the probability of muon capture by helium from a hydrogen mesic atom in the ground state was found to be at least three orders of magnitude smaller than the probability of capture by carbon or oxygen nuclei, Cord 1/2

L 14302-63

ACCESSION NR: AP3003110

and cannot appreciably exceed 1 million per second, in agreement with theoretical estimates made by S. S. Gershteyn (ZhETF v. 43, 706, 1962). Agreement with the Fermi-Teller "Z-law" was indicated for direct attachment of mesons to nuclei in the gas mixture. "The authors are deeply indebted to S. S. Gershteyn, F. F. Yermolov, and E. Pontecorvo for numerous valuable discussions, and to A. I. Pokerskaya and Ye. A. Shvaneva for assistance with the measurements." Orig. cont. has: 3 figures, 10 formulas, and 4 tables.

ASSOCIATION: Ob"yedinenny'y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 23Jan63

DATE ACQ: 23Jul63

ENCL: 00

SUB CODE: 00

NC REF SOV: 003

OTHER: 009

Cord 2/2

ACCESSION NR: AP4018367

S/0120/64/000/001/0069/0075

AUTHOR: Aleksandrov, G. M.; Zaymidoroga, O. A.; Kulyukin, M. M.;
Peshkov, V. P.; Sulyayev, R. M.; Filippov, A. I.; Tsupko-Sitnikov, V. M.;
Shcherbakov, Yu. A.

TITLE: Use of helium-3 for filling a high-pressure diffusion chamber

SOURCE: Pribery* i tekhnika eksperimenta, no. 1, 1964, 69-75

TOPIC TAGS: diffusion chamber, helium-3 tritium separation, high pressure
diffusion chamber, synchrocyclotron, OIYaI synchrocyclotron, high purity helium-3

ABSTRACT: A method of highly purifying helium-3 from tritium ($H^3/He^3 < 10^{-10}$) is described. Helium-3 condensation with subsequent evaporation at 1.2 K was used. The cycle was repeated 4 times; a small amount of H_2 (about 0.005%) was added prior to every liquefaction. The source gas contained 0.1% of H^3 and 0.5-1% of H_2 , D, N, O, and A. The final elimination of H_2 was attained by burning it with copper oxide heated to 500C. The internal parts of the DK-2 standard diffusion chamber (see M. S. Kozodayev, et al., PTE, 1958, no. 6, p. 47) were remodeled; its volume, about 11 lit., was filled with helium-3 up to 20 atm; equipment and

Card 1/2

ACCESSION NR: AP4018367

filling details are given. The chamber was in continuous (500 hrs) operation with the OIYaI synchrocyclotron. It can be filled within 5 hrs. Gas loss at each exposure has been 0.1% or less. "The authors are deeply grateful to P. L. Kapitsa for his permission to separate He^3 from T in IFP AN SSSR, and to V. M. Kuznetsov and A. I. Filimonov for lending the equipment and their help in determining T concentrations. We are also thankful to V. P. Dzhelepov and L. I. Lapidus for their interest in the project, and to K. A. Baycher and S. F. Maly*sheva for their help in building the outfit. Mounting was performed by A. G. Zhukov, P. Ye. Laykov, N. V. Lebedev, V. I. Orekhov, V. F. Poyenko, A. G. Potekhin, and A. I. Chernetskiy, for which we thank them. We would particularly like to acknowledge the discussions as well as the active help of B. Pontecorvo throughout the project stages." Orig. art. has: 4 figures.

ASSOCIATION: Ob'yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Studies)

SUBMITTED: 23Feb63

DATE ACQ: 18Mar64

ENCL: 00

SUB CODE: NS

NO REF SOV: 006

OTHER: 005

Card 2/2

KULYUKIN, S.S. (Tomsk, Krest'yanskiy per., d.4, kv.1)

Observations on the motor function of the small intestine following total gastric resection in man; roentgenologic observations [with summary in English]. Vop.onk. 3 no.5:623-629 '57. (MIRA 11:2)

1. Iz gosspital'noy khirurgicheskoy kliniki Tomskogo meditsinskogo instituta i otdeleniya Instituta eksperimental'noy patologii i terapii raka AMN SSSR (rukovod. - deystv.chl. AMN SSSR prof. A.G.Savinykh)

(INTESTINES, SMALL, physiol.

motor funct. after total gastrectomy, x-ray studies)

(GASTRECTOMY, eff.

on motor funct. of small intestine, x-ray studies)

KULYUKIN, S.S.

Echinococcosis of the spleen. Vest. rent. i rad. 39 no.5:64,
S-0 '64. (MIRA 18:3)

1. Rentgenovskoye otdeleniye (zav. S.S. Kulyukin) Tomskogo
oblastnogo onkologicheskogo dispansera.

KULYUKIN, S.S. (Tomsk, per. Pesechnyy 40-a, kv.1.)

Motor-evacuating function of the bowels following total resection
of the stomach. Vop. onk. 10 no.10:12-16 '64.

(MIRA 18:8)

1. Iz rentgenologicheskogo otdeleniya (zav. S.S.Kulyukin) Tomskogo
oblastnogo onkologicheskogo dispansera (glavnyy vrach A.P.Melikhov).

KULYUKIN, S. .

4-ray evaluation of the operability of cancer of the stomach. Vop.
rak. 11 no.6:9-14 '65. (MIRA 18:8)

1. Iz rentgenovskogo otdeleniya (zav. -- S.S.Kulyukin) Tomskogo
oblastnogo onkologicheskogo dispansera (glavnyy vrach -- A.F.Melikhov).

KULYUKIN, S.S.

Use of a plaster bandage in measuring the cross section of the
body in radiotherapy. Vop. onk. 11 no.3:113-114 '65.

(MIRA 18:6)

1. Iz rentgenologicheskogo otdeleniya (zav. - S.S. Kulyukin)
Tomskogo oblastnogo onkologicheskogo dispansera (glavnyy vrach
- A.P. Melikhov).

LYUKSHENKOVA, Ye.Ye.; KULYUKINA, A.V.

Anatomical structure of big flower Java tea. Apt.delo 5 no.3:
35-38 My-Je '56. (MLBA 9:8)

1. Iz kafedry farmakognozii Moskovskogo farmatsevticheskogo
instituta Ministerstva zdravookhraneniya RSFSR.
(JAVA TEA)

BARASHENKOV, V.S.; BOYADZHIYEV, A.V.; KULYUKINA, L.A.; MAIT'SEV, V.M.

Cascade interactions between particles and nuclei in the high-energy region. Atom. energ. 16 no.6:515-517 Je '64.

(MIRA 17:7)

82016
S/056/60/038/02/17/061
B006/B011

24.6600

AUTHORS: Van Gan-chan, Van Tsu-tszen, Din Da-tsao, Ivanov, V. G.,
Katyshev, Yu. V., Kladnitskaya, Ye. N., Kulyukina, L. A.,
Nguyen Din Ty, Nikitin, A. V., Otvinovskiy, S. Z.,
Solov'yev, M. I., Sosnovskiy, R., Shafranov, M. D.

TITLE: Investigation of the Elastic Scattering¹⁹ of π^- -Mesons With
a Momentum of 6.8 Bev/c on Protons by Means of a Propane
Bubble Chamber

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 2, pp 426-431

TEXT: For the purpose of making a contribution to the problems of proton
structure, the authors investigated the scattering of negative 6.8-Bev/c
pions on protons (wave length $\lambda = 0.112 \cdot 10^{-13}$ cm) in a 24-liter propane
bubble chamber placed in a magnetic field of 13,700 oe. The experimental
setup is shown in Fig. 1. The momentum distribution of π^- -mesons was de-
termined from 112 investigated tracks, and is shown in Fig. 2. The mean
momentum was (6.8 ± 0.6) Bev/c. A total of 3500 frames was interpreted, and

Card 1/4

44 (6)

Investigation of the Elastic Scattering
of π^- -Mesons With a Momentum of 6.8 BeV/c
on Protons by Means of a Propane Bubble
Chamber

82016
S/056/60/038/02/17/061
B006/B011

550 events were selected from all two-pronged stars. The measured values were processed by an electronic computer. The root-mean-square error in the angular determination was $\Delta\theta_\pi = 26'$ and $\Delta\theta_p = 1^\circ 14'$. The correction for track curvature did not exceed $20'$. The elastic π^-p -scattering events were identified by the criteria discussed here: Coplanarity (Fig. 3); angular correlation (Fig. 4); recoil proton range. Among the 550 events investigated, 218 were regarded as being elastic. Fig. 5 shows the distribution of these 218 events along the chamber axis. In the so-called effective region of the chamber (43 cm with a total length of 55 cm), 213 out of the 218 events were recorded. The distribution of these 213 events according to the azimuthal angle of the recoil proton is shown in Fig. 6. In 113 cases the recoil proton track was on top, in 100 it was below, in 115 at the left, in 98 at the right. An estimation of the percentage of quasielastic scattering events in the total number of elastic ones 6%. The cross section of the reaction investigated was found to be

LH

Card 2/4

Investigation of the Elastic Scattering
of π^- -Mesons With a Momentum of 6.8 BeV/c
on Protons by Means of a Propane Bubble
Chamber

82016
S/056/60/038/02/17/061
B006/B011

$\sigma_{el}(\theta'_\pi > 6^\circ) = 3.75^{+0.25}_{-0.55}$ mb, by taking into account a μ^- admixture of

(5+2)%, with a total π^- track length of $1.15 \cdot 10^6$ cm. θ'_π is the scattering angle in the center-of-mass system. The total π^-p interaction cross section was estimated as being (30+5) mb. The final part of the present paper offers an analysis of experimental results on the basis of the optical model, with the proton being regarded as a homogeneous, sharply bounded sphere with a radius $R = 1.05 \cdot 10^{-13}$ cm. The nucleonic absorption coefficient K is assumed to be $K = 0.71 \cdot 10^{13} \text{ cm}^{-1}$. Results are compared with those yielded by experiments (Table, Figs. 7,8). The authors finally thank Academician V. I. Veksler and I. V. Chuvilo for their discussions, N. A. Smirnov, Ye. K. Kuryatnikov, Yu. I. Makarov, M. A. Samarin, L. Ya. Ivanova, and K. N. Radina for their assistance. There are 8 figures, 1 table, and 8 references: 2 Soviet and 6 American.

Card 3/4

Investigation of the Elastic Scattering
of π^- -Mesons With a Momentum of 6.8 Bev/c
on Protons by Means of a Propane Bubble
Chamber

82016
S/056/60/038/02/17/061
B006/B011

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy
(Joint Institute of Nuclear Research)

✓

SUBMITTED: August 28, 1959

Card 4/4

ACCESSION NR: AP4037584

S/0056/64/046/005/1715/1721

AUTHORS: Kopy*lov, G. I.; Kulyukina, L. A.; Polubarinov, I. V.

TITLE: Photoproduction of electron and muon pairs on electrons

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 5, 1964, 1715-1721

TOPIC TAGS: photoproduction, electron, muon, pair production, photon, photon energy

ABSTRACT: The random star method described elsewhere by two of the authors (Kopy*lov and Polubarinov, Preprint OIYaI D-821, 1961) is used to calculate the photoproduction of e^+e^- and $\mu^+\mu^-$ pairs on electrons, under conditions when none of the third-order diagrams contributing to the photoproduction process $\gamma e^- \rightarrow e^-e^-e^+$ can be neglected. The calculations were made in the Born approximation, using a desk calculator, without any neglect, for the intermediate photon energy range, (up to $60m_e$) for which no approximate formulae are

Card 1/2

ACCESSION NR: AP4037584

available. The results of the calculation yield the variation of the cross section and the energy range in which the approximations are applicable. In 1--1.5 hours of calculation, this method yields an accuracy of 5--10%, whereas analytic formulas under the necessary simplifying assumptions can result in an error up to 300%. "The authors thank M. A. Markov for interest in the work and B. N. Valuyev for valuable discussions." Orig. art. has: 7 figures and 13 formulas.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy
(Joint Institute of Nuclear Research)

SUBMITTED: 12Sep63

DATE ACQ: 09Jun64

ENCL: 00

SUB CODE: NP

NR REF SOV: 003

OTHER: 005

Card 2/2

KULYUKINA, N.M.

Present pheasant population in the Volga Delta. Trudy Asir. zap.
no. 8:231-234 '63. (MIRA 18:10)

KOLESNIKOV, G.S.; KORSHAK, V.V.; ~~KULYULIN, I.P.~~

High molecular weight compounds. Part 96. Synthesis and polymerization of 4-vinyldiphenylethane. Zhur.ob.khim. 26 no.3:735-739 (MLRA 9:8)
Mr '56.

1. Institut elementoorganicheskikh soedineniy Akademii nauk SSSR.
(Ethane)

GLADSHTEYN, B.M.; KULYULIN, I.P.; SOBOROVSKIY, L.Z.

Sulfur organic compounds. Part 4: Synthesis of β -chloroethane-
chlorosulfonate. Zhur.ob.khim.. 28 no.9:2417-2419 S '58.
(Chlorosulfonates) (MIRA 11:11)

L 31805-56 ENT(m)/EWP(j) RM

ACC NR: AP6021681

SOURCE CODE: UR/0079/66/036/003/0488/0492

AUTHOR: Gladshteyn, B. M.; Kulyulin, I. P.; Soborovskiy, L. Z.

58
B

ORG: none

TITLE: Cleavage of the heteroatom-oxygen bond by the difluoride of methylphosphinic acid.

SOURCE: Zhurnal obshchey khimii, v. 36, no. 3, 1966, 488-492

TOPIC TAGS: chemical bonding, phosphinic acid, esterification, reaction mechanism, fluoride, fluorinated organic compound, substituent, transition complex, chemical synthesis

ABSTRACT: The difluoride of methylphosphinic acid was found to be capable of cleaving the silicon-oxygen, germanium-oxygen, and arsenic-oxygen bonds, to form the corresponding trialkylsilanol, trialkylgermanol, and dimethylarsinol esters of methylfluorophosphinic acid and trialkylfluorosilane, trialkylfluorogermane, or trialkylfluoroarsine, respectively. The fluoride of ethanesulfonic acid does not cleave disiloxane bonds. The reactions studied are proposed as a convenient preparative method for synthesizing new silanol, germanol, and arsinol esters of methylfluorophosphinic acid, which are difficult to prepare otherwise. A reaction mechanism is proposed: nucleophilic attack on the phosphorus atom of the difluoride of methylphosphinic acid by the electron pair of the oxygen atom of the reacting molecule, in accord with the general theory of substitution at a tetrahedral phosphorus atom through a transition complex. [JPRS]

SUB CODE: 07 / SUBM DATE: 23Jun65 / ORIG REF: 007 / OTH REF: 018
Card 1/1 UDC: 547.241

KULYUPIN, A. T.; KHAIT, A. E.; UTKINA, S. A.; GARKINOV, A. I.

"Methods of Ascertaining the Profitability of Communications Enterprises," Vest. Svyazi, No. 8, pp 16-18, 1952.

Head of the Radio Department of the Rostov-na-Doni Polytechnical School of Communications.

Critique, M-745, 30 Aug 55

KULYUPIN, A. T.

"What is Hindering the Training of Qualified Technicians for Radiofication?"
Vest. Svyazi, No.8, pp. 18-19, 1952

Head of the Radio Dept., Rostov-on-Don Polytech. School of Communications

Translation M-745, 30 Aug 55

L 16140-63 EWP(q)/BDS/EWT(m) AFPTC/ASD JD

ACCESSION NO: AP3005157

S/0058/63/000/006/0046/0046

SOURCE: RZh. Fizika, Abs. 6 D313

AUTHOR: Kulyupin, Yu. A.

TITLE: Temperature dependence of the intrinsic absorption edge of sodium nitrite

CITED SOURCE: Sb. Materialy* 3-y Nauchn. Konferentsii aspirantov. Rostovsk. un-t. Rostov-na-Donu, 1961, 115-117

TOPIC TAGS: sodium nitrite, intrinsic absorption, temperature variation, edge shift

TRANSLATION: The behavior of the edge of intrinsic absorption of sodium nitrate was investigated as the temperature was varied near the phase transition. The spectra were registered photographically with a DFS-4 spectrograph. The quantitative temperature dependence of the edge shift was in agreement with the theoretical results of A Radowsky (Phys. Rev., 1948, v. 73, 749). It is assumed that the temperature dependence of the edge shift can also be attributed to the temperature broadening of the exciton absorption bands. The nonlinear shift of the

Cord 1/2

L 10145-63

ACCESSION NR: AR3005157

edge in the region of the phase transition is attributed to a change in the selection rules for inter-band transitions, due to a change in the crystal symmetry, leading to a different potential distribution in the unit cell.

DATE ACQ: 15Jul63

SUB CODE: PH

ENCL: 00

Card 2/2

21105

S/051/61/010/006/001/002
E032/E314

24.3500 (1137, 1138, 1147)

AUTHORS: Grigor'yev, N.N. and Kulyupin, Yu.A.

TITLE: Some Results of a Study of the Process of Phosphor
Deterioration During Electroluminescence

PERIODICAL: Optika i spektroskopiya, 1961, Vol. 10, No. 6,
pp. 780 - 786

TEXT: Roberts (Ref. 1) and Thornton (Ref. 2) have suggested that the reduction in the light yield of a phosphor during luminescence is due to changes in the properties of the phosphor itself. Roberts considers that there is a reduction in the number of luminescence centres while Thornton suggests that this number remains constant but the electrical properties of the phosphor undergo a change. The present authors have carried out experiments to elucidate the mechanism responsible for the deterioration of phosphors. The apparatus employed is illustrated schematically in Fig. 1. The two transparent electrodes 1 and 2 can be rotated relative to each other with the gap between them remaining constant at about 50 μ . Fine crystals of the phosphor are placed in this gap in the

Card 1/6

21105

S/051/61/010/006/001/002
EO32/E314

Some Results of

form of a suspension in a liquid dielectric. Rotation of the electrodes gives rise to a rotation of some of the fine crystals so that the luminescence of all parts of these crystals can be eventually observed. Only the central region of the suspension is observed by means of the stop 6. In this way, the effect of new particles entering the field of view is excluded. The Phosphor was ZnS-ZnO-Cu, Al, Cl suspended in silicon oil. In order to accelerate the deterioration process, the phosphor was excited by an electric field of

5×10^4 V/cm at a frequency of 15 kc/s. The luminescence was recorded by the photomultiplier 9, whose output was fed into the microammeter 10 (M-95) and the oscillograph 11 (3HO-1 (ENO-1)). The photoluminescence was excited by light with $\lambda_{\max} = 3650 \text{ \AA}$ and was recorded in the green band

with the aid of the crossed filters 5. The type PRK-2 (PRK-2) lamp was used as the source of light 3. It was first established that the deterioration process is largely independent of the surrounding dielectric and is a function

Card 2/6

21105

S/051/61/010/006/001/002
E032/E314

Some Results of

of the properties of the phosphor only. Fig. 2 shows the relative change in the intensity of the electroluminescence (green band) of the phosphor during a periodic rotation of the electrodes (Curve 1 - 400 c.p.s., 240 V; Curve 2 - 15 kc/s, 240 V; Curve 3 - 15 kc/s, 100 V; the time is plotted in hours along the horizontal axis). The phosphor deterioration can clearly be seen in Fig. 2, although a partial recovery of the light yield during the rotation of the electrodes is also apparent. This is said to suggest that the basic process of deterioration occurs not in the entire crystal but in certain parts of it. All the experiments appear to confirm the localised character of the deterioration and there is evidence that the deterioration occurs at the surface. Calculations of the intensity of photoluminescence as a function of time show that it should decrease by 22% over 150 hours (Fig. 3, Curve 1). On the other hand, the measured intensity is found to be constant (Curve 3, Fig. 2). From this, it is concluded that the luminescence centres remain unaltered during the deterioration process since the above

Card 3/6

21105

S/051/61/010/006/001/002
E032/E314

Some Results of

calculation was based on the Roberts hypothesis. The phenomenon of electroluminescence is very dependent on the presence of a positive space-charge region which appears under the action of the external field. It is suggested that the spreading of the space-charge region may be responsible for the reduction of the field in the crystal and lead to a reduction in the number of electrons capable of taking part in the luminescence and their effectiveness in this process, i.e. it will give rise to a reduction in the intensity. This may give a qualitative explanation of the variation of the intensity with voltage and frequency, the changes in the form of brightness waves and the changes in the luminescence spectrum which occur in the phosphor during the deterioration process. The reason for this spread of the space-charge region is not very clear although it is probably associated with the appearance of new local capture levels whose formation may be affected by the surrounding

Card 4/6

Some Results of

21105
S/051/61/010/006/001/002
E032/E314

medium. Acknowledgments to M.V. Fok and V.V. Antonov-Romanovskiy for suggestions and discussions and to R.M. Medvedeva, A.N. Savin for assistance in this work. There are 6 figures, 1 table and 11 references: 5 Soviet and 6 non-Soviet.

SUBMITTED: July 11, 1960

Card 5/6

22183

S/048/61/025/004/032/048
B117/B212

24.3500

AUTHORS: Grigor'yev, N. N. and Kulyupin, Yu. A.

TITLE: Several results obtained from investigations of the
destruction process of luminophors during electroluminescence

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25,
no. 4, 1961, 526-527

TEXT: The present paper was read at the 9th Conference on Luminescence (crystal phosphors). The authors have investigated the destruction process of $ZnS.ZnO-Cu, Al, Cl$ luminophors, according to the operation time. The phosphorus mixed with silicon oil was in a capacitor, which construction made it possible to change the location of the working particles by keeping the excitation and observation conditions constant. This made possible a strong destruction of the phosphorus in each crystal volume and it was accompanied by a fast drop of brightness. The brightness of the photoluminescence did not change, a drop of $\sim 22\%$ has been expected. This value had been found by assuming that a strong destruction would take place in $\sim 5\%$ of the crystal volume during each semiperiod of the field.

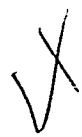
Card 1/3

22183

S/048/61/025/004/032/048
B117/B212

Several results obtained...

Under the test conditions given the value of 5% has not been to high. This circumstance leads to the conclusion that the luminescence properties of the phosphorus destructed during electroluminescence will not change. Since the ratio of the light blue to the green band intensity will increase during destruction it can be assumed that the phosphorus but not the surrounding dielectric will be affected. The partial regeneration of the brightness observed when changing the position of the working particles points to a local character of the destruction. Probably, it will take place there, where due to applying an electric field to the crystal the formed positive space charge will be concentrated. The brightness drop of the electroluminescence may be explained as follows: The space charge will expand due to a decrease of the density and this is accompanied by a decrease of the internal field of the crystal. This explanation is also valid for the change of frequency characteristics and the dependence of the brightness from the voltage. Due to the change of the space charge region the characteristic of the brightness has to change also. It has been observed that the ratio of the variable brightness wave components to the constant component and also the ratio of the additional maximum of the brightness wave to the principal maximum will



Card 2/3

22183

S/048/61/025/004/032/048
B117/B212

Several results obtained...

increase. This agrees well with the hypothesis established. And, to a certain degree, the hypothesis also shows no discrepancy for the different behavior of light blue and green electroluminescence bands. This behavior is responsible for the fact that the phosphorus becomes green during its destruction. The cause for the expansion of the space charge could not be cleared. [Abstracter's note: Essentially complete translation].

X

Card 3/3

S/181/62/004/003/020/045
B125/B108

AUTHORS: Yatsenko, A. F., Kulyupin, Yu. A., and Rabkin, L. M.

TITLE: Discrete structure of the self-absorption edge of sodium nitrite

PERIODICAL: Fizika tverdogo tela, v. 4, no. 3, 1962, 692-696

TEXT: The authors studied the discrete structure of the self-absorption edge in a ferroelectric sodium nitrite crystal in polarized light of

3250-3900 Å for the three crystallographic directions a, b, and c by means of RD-4 (DFS-4) and ИСР-28 (ISF-28) spectrographs. For low-temperature measurements, the samples were directly immersed in liquid nitrogen. The crystals were prepared by evaporating the aqueous solution, by pricking the crystal out of the solidified melt, or by solidifying a film of melt on a backing or between two transparent backings. At room temperature and with very thick crystals ($d \sim 1$ mm), the edge of the transmission curve is

in the region of 4000, 3950, and 4050 Å for the axes a, b, and c, respectively. With decreasing concentration, the longwave edge of the
Card 1/3

Discrete structure of the self-...

3/181/62/004/003/020/045
B125/B108

transmission curve of the band of the first electron transition of the aqueous NaNO_2 solution shifts toward ultraviolet. Similar observations have been made also for thinner crystals. Fig. 2 shows the transmission curves for thin crystals ($d = 10\text{-}20\mu$) and for an aqueous solution of low concentration at room temperature. In the spectrum along the a axis, the absorption ranges from 3850 to 3250 \AA with a distinct vibrational structure with $\sim 630\text{ cm}^{-1}$; this consists of the series $\nu = \nu_{00} + n\nu_2$,

$\nu_1 = \nu_{00} + \nu_1 + n\nu_2$, and $\nu'' = \nu_{00} + n\nu_1$. The spectrum for the b axis has no structure. The absorption which increases more slowly with increasing frequency attains its maximum at $\sim 3000\text{ \AA}$. The b-spectrum of thick crystals ($d = 0.5\text{ mm}$) contains no 0-0 band and no vibrational bands caused by electrons, but it shows a distinct series $\nu = \nu_{00} + n\nu_2 + 1$ with $\nu = 56\pm 2; 104\pm 2; 204\pm 2$, and $515\pm 10\text{ cm}^{-1}$. The c-spectrum is similar to the a-spectrum, but the relative intensities of its bands differ from the a-spectrum. The weak low-frequency lines are caused by lattice vibrations. There are 4 figures, 1 table, and 13 references: 4 Soviet and 9 non-Soviet. The four most recent references to English-language publications read as Card 2/4

Discrete structure of the self-...

S/181/62/004/003/020/045
B125/B108

follows: S. Sawada, et al. Phys. Rev. Lett. 1, 320, 1958; J. W. Sidman. J. Amer. Chem. Soc., 78, 2911, 1956; J. W. Sidman. J. Amer. Chem. Soc., 79, 2669, 1957; W. D. Trawick, W. H. Eberhardt, J. Chem. Phys., 22, 1462, 1954.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet (Rostov-na-Donu State University)

SUBMITTED: March 27, 1961 (initially) November 9, 1961 (after revision)

Fig. 2. Transmission curves at room temperature. Legend: (1) along the a-axis, (2) along the b-axis, (3) along the c-axis, (4) NaNO_2 aqueous solution, (5) transmission, %.

Card 3/4

KULYUPIN, Yu. A.; YATSENKO, A.F.

Absorption spectrum of sodium nitrite crystals at 20° K. Fiz.
tver. tela 5 no.10:2756-2765 0 '63. (MIRA 16:11)

1. Institut fiziki AN UkrSSR, Kiyev.